REMARKS

Claims 1-7 and 31-42 were pending in the present application. Claim 7 has been withdrawn as directed to a non-elected invention. Claims 1, 2, 33, and 34 have been amended to incorporate the sequence that is unique to MnSOD E3(-). Claims 31 and 41 have been canceled without prejudice in view of their incorporation into the amended claims. No new matter has been added. Upon entry of the present amendment, claims 1-6 and 32-40, and 42 will be pending.

I. Brief Summary of the Claimed Invention

The present summary is provided as an aid to the Examiner. The presently claimed invention is directed to an isolated nucleic acid, a vector, an isolated host cell, and methods of using the same relating to a novel DNA and protein sequence that is referred to as exon-3 deleted manganese superoxide dismutase (MnSOD E3(-)). A splice variant of MnSOD, which is referred to as MnSOD E3(-), differs from MnSOD because it lacks the third exon and has a sequence that is not present in MnSOD. The sequence that is absent from MnSOD, but is present in MnSOD E3(-) is referred to in the specification as SEQ ID NO:3. MnSOD E3(-) enzymatic activity is the opposite of MnSOD. In particular, MnSOD E3(-) has ***pro***-oxidant activity, whereas MnSOD has ***anti***-oxidant activity. Accordingly, the present invention describes a molecule (amino acid and nucleic acid), MnSOD E3(-), that although similar in sequence to MnSOD, has enzymatic activity that is opposite to MnSOD due to the lack of the third exon. As discussed above, the deletion of the third exon generates a nucleic acid sequence, SEQ ID NO:3, that is unique to MnSOD E3(-), which encodes for the amino acid sequence SEQ ID NO:4.

II. Objection of Claims 32, 36, 39, and 42

Claims 32, 36, 39, and 42 are objected to because they depend on rejected claims. The Examiner, however, indicates that these claims would be allowable if rewritten in independent form. Applicant respectfully asserts that the objection to claims 32, 36, 39, and 42 is improper and that these claims should be in condition for allowance in view of the present response. In the

event that the rejections listed below are maintained, however, Applicant reserves the right to amend the claims to place them into independent form as suggested by the Examiner.

III. The Claimed Invention Is Novel

Claims 1, 3-6, 33, 37, 38, and 40 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 5,240,847 (hereinafter, the Heckl reference). The Examiner asserts that the Heckl reference reports a nucleic acid sequence that encodes a protein at least 70% identical to SEQ ID NO:2 and, therefore, anticipates the present invention. Applicant respectfully disagrees in view of amended claim 1.

As amended herein, claim 1 recites:

> An isolated nucleic acid molecule encoding a protein comprising an amino acid sequence comprising at least 70% sequence identity to SEQ ID NO: 2, wherein the protein has pro-oxidant activity **and comprises SEQ ID NO: 4**. (emphasis added)

The standard for anticipation under §102(b) is one of strict identity. An anticipation rejection requires a showing that each feature of a claim be found in a single reference. *Atlas Powder Co. v. E.I. DuPont de Nemours & Co.*, 224 U.S.P.Q. 409, 411 (Fed. Cir. 1984). The Heckl reference fails to anticipate the pending claims because it does describe or suggest a nucleic acid molecule that encodes a protein comprising SEQ ID NO:4, as recited in the rejected claims. Thus, the Heckl reference does not teach the claimed invention.

In view of the foregoing, Applicant respectfully requests that the rejection under 35 U.S.C. §102(b) be withdrawn.

IV. The Claimed Invention Is Supported by Ample Written Description

Claims 1-6, 31, 33-35, 40, and 41 are rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. The Examiner alleges that the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skill in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. In particular, the Examiner mistakenly asserts that

"Applicant has not indicated what is the distinguishing characteristics are or defined what structure is required" (Office Action at page 3). Applicant respectfully disagrees.

The M.P.E.P §2163 states:

> Possession may be shown in a variety of ways including description of an actual reduction to practice, or by showing that the invention was "ready for patenting" such as by the disclosure of drawings or structural chemical formulas that show that the invention was complete, or ***by describing distinguishing identifying characteristics sufficient to show that the applicant was in possession of the claimed invention.*** (emphasis added)

Applicant has sufficiently described "distinguishing identifying characteristics" to show possession of the claimed invention. For example, Applicant has described an isolated nucleic acid molecule encoding a protein comprising an amino acid sequence comprising SEQ ID NO:2, wherein the protein has pro-oxidant activity. Applicant has further described the claimed invention by amending the claims to state that the nucleic acid molecule that encodes the protein comprises SEQ ID NO:3 or that the protein encoded by the nucleic acid molecule comprises SEQ ID NO:4. SEQ ID NO:3 and SEQ ID NO:4 comprise sequences that are *unique* to MnSOD E3(-) and are the "***distinguishing***" characteristic of the present invention.

Applicant has also described an isolated nucleic acid molecule encoding a protein comprising an amino acid sequence comprising at least 70% sequence identity to SEQ ID NO:2, wherein the protein has *pro-oxidant activity* and comprises SEQ ID NO:4. Applicant has also described what is meant by 70% sequence identity and how to determine the percent identity (specification, page 9). Applicant has also described a function of the protein encoded by the nucleic acid molecule as pro-oxidant. The specification amply correlates the pro-oxidant activity with the presence of SEQ ID NO:4. In contrast to the suggestion in the Office Action at page 3, description of a structure (SEQ ID NO:4) in combination with function (pro-oxidant activity) provides sufficient identifying characteristics. Thus, Applicant has clearly described the distinguishing characteristics of the subject matter recited in claim 1, which include both the sequence (encoding for an amino acid sequence that is 70% identical to SEQ ID NO: 2 and comprising SEQ ID NO:4) and function of the encoded protein (pro-oxidant). Accordingly, claim 1 is clearly described.

Applicant has also sufficiently described the subject matter recited in claim 2 (i.e., "an isolated nucleic acid molecule comprising at least 97% identity to SEQ ID NO: 1 encoding a protein that has pro-oxidant activity and comprises SEQ ID NO:3"). One of skill in the art would clearly understand that Applicant was in possession of sequences that are 97% identical to SEQ ID NO:1 and comprise SEQ ID NO:3. Again, the claimed nucleic acid molecule comprises a specific structure and a specific function. One of skill in the art would clearly understand that Applicant was in possession of the claimed invention.

In view of the foregoing, Applicant respectfully requests that the written description rejection under 35 U.S.C. § 112 be withdrawn.

V. The Claimed Invention Is Sufficiently Enabled

Claims 1-6, 33, 34, and 40 are rejected under 35 U.S.C. §112, first paragraph as allegedly failing to provide an enabling disclosure. The Office Action mistakenly asserts that, although the specification enables SEQ ID NO:1, the specification allegedly does not reasonably provide enablement for sequences with homologies less than 100%. The Office Action also alleges that the claims are drawn to a particular sequence with a functional feature and that the Heckl reference teaches a similar sequence with a different function but that the "specification does not teach what is required of the coding sequence to both have the recited structure and the recited function" (Office Action, at page 5). The Office Action mistakenly concludes that it would require undue experimentation for one skilled in the art to practice the claimed invention. Applicant traverses the rejection and respectfully requests reconsideration because one skilled in the art would be able to practice the claimed invention without being required to perform undue experimentation.

As amended herein, the claims recite that the nucleic acid encoding the protein comprises SEQ ID NO:3 or the protein encoded by the nucleic acid comprises SEQ ID NO:4. These sequences are unique sequences to MnSOD E3(-) and is what causes the activity of MnSOD E3(-) to be pro-oxidant as opposed to the anti-oxidant activity of MnSOD. One of skill in the art, upon examining Applicant's specification, would be able to construct a nucleic acid sequence that has at least 70% or 97% identity to SEQ ID NO:1 and comprises SEQ ID NO:3 or

a nucleic acid molecule that encodes a protein that has at least 70% or 97% identity to SEQ ID NO:2 and comprises SEQ ID NO:4. One of skill in the art would also be able to translate such a nucleic acid molecule into a protein and determine if the nucleic acid encodes a protein that has pro-oxidative activity using no more than routine experimentation and following the examples in the specification (see, for example, Example 5). Nothing more than following the Examples in the specification is required.

The Examiner appears to allege that one of skill in the art is incapable of making a nucleic acid molecule that encodes a protein that has either 70% or 97% identity to SEQ ID NO:2 and comprises SEQ ID NO:4 and then determine whether it has pro-oxidant activity by following the examples in the specification. Cloning and modifying a nucleic acid molecule is routine experimentation for one of skill in the art. Following the examples in the specification is also nothing more than routine experimentation. If the Examiner maintains the rejection, Applicant respectfully requests further clarification on why one of skill in the art would be unable to perform such routine experiments, particularly in view of Applicant's specification.

The Examiner has also failed to present a proper enablement analysis for undue experimentation as described in *In re Wands* 58 F.2d 731, 737, 8 USPQ.2d 1400, 1404 (Fed. Cir. 1988) and as required by the MPEP (see, Section 2164). There are several factors that should be analyzed before determining that a claimed invention is not enabled and the Examiner has not presented a proper analysis to maintain an enablement rejection. *See, In re Wands.*

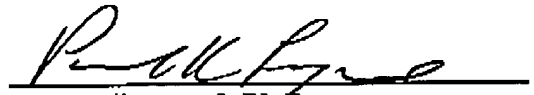
Accordingly, because one of ordinary skill in the art can make molecules described in the claims and can determine their activity by using nothing more than routine experimentation and the present specification, the claims are sufficiently enabled. In view of the foregoing, Applicant respectfully requests that the enablement rejection under 35 U.S.C. §112 be withdrawn.

DOCKET NO.: MTGY0001-101 **PATENT**

VI. Conclusion

In view of the foregoing, Applicant respectfully submit that the claims are in condition for allowance. An early notice of the same is earnestly solicited. The Examiner is invited to contact Applicant's undersigned representative at (215) 665-6914 if there are any questions regarding Applicant's claimed invention.

Respectfully submitted,



Paul K. Legaard, Ph.D.
Registration No. **38,534**

Date: **12 April 2006**

COZEN O'CONNOR
1900 Market Street
Philadelphia, PA 19103-3508
Telephone: (215) 665-6914
Facsimile: (215) 701-2141